Manon Kok

PhD student

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Born:
October 19, 1982
Amsterdam, the Netherlands

Nationality:
Dutch

Education

Doctor of Philosophy in Automatic Control

Linköping, Sweden

Linköping University

Aug. 2011 - Present

Research focus on position and orientation estimation using inertial sensors. The results from this research have been presented in multiple peer-reviewed journals and conferences as listed under publications.

PhD defense: PhD defense is planned on January 13th 2017.

Title of PhD thesis: *Probabilistic modeling for sensor fusion with inertial measurements*

Supervisor: Prof. Thomas B. Schön

Co-supervisors: Prof. Fredrik Gustafsson and Dr. Jeroen D. Hol

A PhD degree also includes two years of postgraduate coursework. These courses include courses on: System Identification, Machine Learning, Target Tracking, Convex Optimization, Numerics in Filtering and Identification, Linear Systems, Nonlinear Systems, Robust Multivariable Control, Matrix Analysis, Computational Linear Algebra, Digital Signal Processing, Security and limitations of Cyber-physical Systems, Networked Control and Multi-Agent Systems, Teaching in Higher Education, Popular Scientific Presentation.

Licentiate in Automatic Control

Linköping, Sweden

Linköping University

June 2014

A licentiate degree is a degree that can be obtained after 2.5 – 3 years of the PhD.

Title of Licentiate's thesis: *Probabilistic modeling for positioning applications using inertial sensors*

Supervisor: Prof. Thomas B. Schön

Co-supervisor: Prof. Fredrik Gustafsson

Master of Science in Applied Physics

Enschede, the Netherlands

University of Twente

Jan. 2009

Focus on courses in materials physics and in high energy physics. The degree includes an internship at the national institute for sub-atomic physics (NIKHEF) and a master thesis at the low temperature division at the University of Twente. The master thesis has resulted in paper [J1].

Title of Master's thesis: *Spin-selective tunneling through ferromagnetic insulating EuO barriers*

Supervisor: Prof. Dr. Ir. Alexander Brinkman

Co-supervisor: Dr. Joost N. Beukers

Master of Science in Philosophy of Science, Technology and Society

Enschede, the Netherlands

University of Twente

Jun. 2007

The program consists of courses in amongst others philosophy of science, ethics, history of philosophy and philosophy of technology in society. The master thesis is in the field of philosophy of science.

Title of Master's thesis: *Causal explanations in quantum mechanical experiments* (translation of original Dutch title)

Supervisor: Prof. Dr. Ir. Mieke Boon

Bachelor of Science in Applied Physics

Enschede, the Netherlands

University of Twente

Aug. 2005

The program consists of courses in amongst others quantum mechanics, electromagnetism, thermodynamics, mechanics, dynamics

and mathematics.

Title of Bachelor's thesis: *Experiments to test Bell's inequalities by using superconducting structures as a source of entangled electrons*

Supervisor: Prof. Dr. Ir. Alexander Brinkman

Work experience

Teaching assistant

Linköping, Sweden

Linköping University

Aug. 2011 - Present

The PhD program includes a year of teaching both undergraduate and postgraduate students. My teaching experience includes:

- Sensor fusion, master level course – Teaching problem solving sessions and labs (2014, 2015)
- Digital signal processing, master level course – Teaching problem solving sessions and labs (2015)
- Industrial Control Systems, bachelor course – Teaching problem solving sessions and labs (2012, 2013)
- Automatic Control, basis course – Teaching problem solving sessions and labs (2012)
- Matlab, introductionary course – Teaching problem solving sessions (2011)
- Diverse project courses – Supervision (2011, 2012, 2014)
- Master thesis supervision:
  - Towards realtime estimation of human motion using inertial sensors without magnetometers – an optimization-based filtering approach – Michael Lorenz, 2016 (master thesis from TU Berlin, performed at Linköping University. Supervisors from TU Berlin: Dr.-Ing. Thomas Seel and Dipl.-Ing. Philipp Müller).
  - GNSS-aided inertial human body motion capture – Victoria Alsén, 2016 (performed at Xsens Technologies).
  - Real-Time Adaptive Audio Mixing System Using Inter-Spectral Dependencies – Robert Koria, 2016 (performed at Linköping University).
  - State Estimation of UAV using Extended Kalman Filter – Thom Magnusson, 2013 (performed at Instrument Control).
  - Road Grade and Vehicle Angle Estimation Using Inertial Sensors and Non-Linear Kalman Filtering – Björn Rödseth, 2013 (performed at NIRA Dynamics).
  - Map Aided Indoor Positioning – Johan Kihlberg and Simon Tegelid, 2012 (performed at Xdin).
  - Modelling and control of an advanced camera gimbal – Jakob Johansson, 2012 (performed at Intuitive Aerial).

Visiting researcher

Espoo, Finland

Aalto University

Jan. 2015 - Mar. 2015

A 2.5-month research visit to the Bayesian Methodology Group, cooperating with Dr. Simo Särkkä and Dr. Arno Solin on the subject of modeling and interpolation of the ambient magnetic field using Gaussian processes. The cooperation has resulted in paper [WM1].

Research Engineer

Enschede, the Netherlands

Xsens Technologies B.V.

Febr. 2009 - Jul. 2011

Focus on sensor fusion of inertial sensors, magnetometers and GPS for position and orientation estimation.

Internship

Amsterdam, the Netherlands

National Institute for Subatomic Physics (NIKHEF)

Sept. 2007 - Dec. 2007

Diverse contributions to the HiSPARC project. In this project, cosmic ray detectors are placed on secondary schools. They result in a large amount of data that needs to be analyzed and interpreted. A major goal of the project is to offer secondary school students the opportunity to participate in research. The internship was performed under supervision of Dr. David Fokkema and Prof. Dr. Ing. Bob van Eijk.

Board member

Enschede, the Netherlands

Central Residents Council Drienerlo (CBR)

2003 - 2004

The CBR acts on behalf of the tenants of Acasa Student Housing in Enschede.

Board member

Enschede, the Netherlands

Drienerlose Table Tennis Association Thibats

2001 - 2002

In the board I both held the function of chairman and of competition secretary.

Publications

Journal papers

[J4] **Manon Kok** and Thomas B. Schön, Magnetometer calibration using inertial sensors. IEEE Sensors Journal 16(14): 5679 - 5689, 2016.

[J3] **Manon Kok**, Jeroen D. Hol and Thomas B. Schön, Indoor positioning using ultrawideband and inertial measurements. IEEE Transactions on Vehicular Technology 64(4):1293-1303, 2015.

[J2] Alf J. Isaksson, Johan Sjöberg, David Törnqvist, Lennart Ljung and **Manon Kok**, Using horizon estimation and nonlinear optimization for grey-box identification. Journal of Process Control, 2015.

[J1] **Manon Kok**, Joost N. Beukers, Alexander Brinkman Spin-polarized tunneling through a ferromagnetic insulator Journal of Applied Physics, 105 (7). 07C919. ISSN 0021-8979.

Conference papers

[C10] **Manon Kok**, Sina Khoshfetrat Pakazad, Thomas B. Schön, Anders Hansson, Jeroen D. Hol, A Scalable and Distributed Solution to the Inertial Motion Capture Problem. Proceedings of the 19th International Conference on Information Fusion, pp. 1348–1355, Heidelberg, Germany, July 2016.

[C9] Fredrik Olsson, **Manon Kok**, Kjartan Halvorsen and Thomas B. Schön, Accelerometer calibration using sensor fusion with a gyroscope. Proceedings of the IEEE Workshop on Statistical Signal Processing, pp. 660–664, Palma de Mallorca, Spain, June 2016.

[C8] **Manon Kok**, Johan Dahlin, Thomas B. Schön and Adrian Wills, Newton-based maximum likelihood estimation in nonlinear state space models. Proceedings of the 17th IFAC Symposium on System Identification, pp. 398-403, Beijing, China, October 2015.

[C7] Andreas Svensson, Thomas B. Schön and **Manon Kok**, Nonlinear state space smoothing using the conditional particle filter. Proceedings of the 17th IFAC Symposium on System Identification, pp. 975-980, Beijing, China, October 2015.

[C6] Joel Kronander, Johan Dahlin, Daniel Jönsson, **Manon Kok**, Thomas B. Schön and Jonas Unger, Real-time video based lighting using GPU raytracing. Proceedings of the 22nd European Signal Processing Conference (EUSIPCO), Lisabon, Portugal, September 2014.

[C5] **Manon Kok** and Thomas B. Schön, Maximum likelihood calibration of a magnetometer using inertial sensors. Proceedings of the 19th World Congress of the International Federation of Automatic Control (IFAC), pp. 92-97, Cape Town, South Africa, August 2014.

[C4] **Manon Kok**, Jeroen D. Hol and Thomas B. Schön, An optimization-based approach to human body motion capture using inertial sensors. Proceedings of the 19th World Congress of the International Federation of Automatic Control (IFAC), pp. 79-85, Cape Town, South Africa, August 2014. *Honorable mention, nominated for the best application paper prize.*

[C3] **Manon Kok**, Niklas Wahlström, Thomas B. Schön and Fredrik Gustafsson, MEMS-based inertial navigation based on a magnetic field map. The 38th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Vancouver, Canada, May 2013.

[C2] Niklas Wahlström, **Manon Kok**, Thomas B. Schön and Fredrik Gustafsson, Modeling magnetic fields using Gaussian processes. The 38th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Vancouver, Canada, May 2013.

[C1] **Manon Kok**, Jeroen D. Hol, Thomas B. Schön, Fredrik Gustafsson and Henk Luinge, Calibration of a magnetometer in combination with inertial sensors. The 15th International Conference on Information Fusion, Singapore, July 2012.

Working manuscripts

[WM2] **Manon Kok**, Jeroen D. Hol, Thomas B. Schön, Using inertial sensors for position and orientation estimation. Technical Report LiTH-ISY-R-3093, Department of Electrical Engineering, Linköping University, Linköping, Sweden, December, 2016.

[WM1] Arno Solin, **Manon Kok**, Niklas Wahlström, Thomas B. Schön and Simo Särkkä, Modeling and interpolation of the ambient magnetic field by Gaussian processes. Submitted.

Skills

Languages Dutch (native), English (fluent), Swedish (fair), German (passive)
Computer skills Matlab, LaTeX, Microsoft Windows, Mac OS, Microsoft Office

References

Available upon request.